(19)日本国特許庁（ＪＰ）　(12) **公開特許公報（A）**　(11)特許出願公開番号

特開平7－119078

(43)公開日　平成７年(1995)５月９日

(51)Int.Cl.[6]	識別記号	庁内整理番号	ＦＩ		技術表示箇所
Ｄ２１Ｈ　19/10					
17/05					
		7199－3B	Ｄ２１Ｈ	1/ 34	Ａ

審査請求　未請求　請求項の数２　ＦＤ　（全 ５ 頁）

(21)出願番号　特願平5－196953

(22)出願日　平成５年(1993)７月13日

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(54)【発明の名称】　新聞用紙用表面サイズ剤および新聞用紙の製造方法

(57)【要約】

【構成】　ケテンダイマー化合物を有効成分としてなる表面サイズ剤および紙表面加工剤を含有してなる塗工液を、ゲートロールコーターにより新聞原紙に塗工して新聞用紙を製造する。

【効果】　高濃度、高速塗工が可能なゲートロールコーターを用いて新聞用紙を製造することが可能になり、操業性を低下させず、また新聞用紙の品質を悪化させることなく新聞用紙に所望のサイズ性を付与することができる。

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【特許請求の範囲】

【請求項１】　ケテンダイマー化合物を有効成分としてなる新聞用紙用表面サイズ剤。

【請求項２】　紙表面加工剤および請求項１記載の表面サイズ剤を含有してなる塗工液を、ゲートロールコーターにより新聞原紙に塗工することを特徴とする新聞用紙の製造方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は新聞用紙用表面サイズ剤および新聞用紙の製造方法に関する。

【０００２】

【従来の技術】近年、新聞印刷方式のオフセット印刷への移行により、湿し水に対する耐水性が新聞用紙にとって重要な要求品質となっている。しかし、紙に耐水性（サイズ性）を付与する方法として知られている方法、たとえば、抄紙時に内添サイズ剤を原料パルプスラリーに添加する方法や、抄紙後の紙に表面サイズ剤を塗工する方法は新聞用紙の製造に適用すると種々の問題がある。

【０００３】すなわち、一般に新聞用紙が抄造される酸性抄紙で汎用されている内添サイズ剤であるロジンエマルジョンサイズ剤は、本来水溶性のないマレイン化またはフマル化ロジンを界面活性剤により水に分散させているため、本質的に泡立ちやすく、新聞抄紙機の様な高速抄紙機では白水系で泡立ちによるトラブルを引き起こしやすい。また、新聞用紙はサイズ効果の発現しにくいグランドパルプを原料として多用しているため、内添サイズ剤とともに歩留向上剤が併用される場合には抄紙系内のピッチ等も紙中に取り込み、新聞用紙の白色度を低下させ品質悪化の原因になるといった不利もある。

【０００４】また、新聞抄紙機は高速抄紙機であり、オンマシンの表面加工剤の塗工は、サイズプレスのような低濃度塗工液を塗工する塗工機では紙切れを起こすため、塗工液濃度が高く、高速塗工が可能な被膜形成転写方式によるゲートロールコーターが一般的である。しかし、表面サイズ剤として知れらているスチレン／マレイン酸共重合体、スチレン／アクリル共重合体、オレフィン／マレイン酸共重合体等のポリマーサイズ剤は、サイズプレスのように低濃度の塗工液で塗工され、紙に浸透した後に乾燥によりパルプ繊維と結合してサイズ効果を発現するように設計されているため、ゲートロールコーターに適用しても塗工液の紙層への浸透が少なく、ポリマーサイズ剤とパルプ繊維の結合が不十分であり、サイズ効果が全く発現しないか、または発現してもその効果が弱い。

【０００５】このように、公知の表面サイズ剤を新聞用紙の製造に適用しても十分なサイズ効果が得られないため、操業性の低下、品質の悪化にもかかわらず内添サイズ剤を使用しているのが現状である。

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【０００６】

【発明が解決しようとする課題】本発明は、ゲートロールコーターを用いた新聞用紙の製造に適用でき新聞用紙に所望のサイズ性を付与しうる表面サイズ剤、および該表面サイズ剤を用いて新聞用紙を製造する方法を提供することを目的とする。

【０００７】

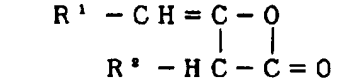
【課題を解決するための手段】本発明者は、前記従来技術の課題を解決すべく、鋭意研究を重ねた結果、表面サイズ剤としてケテンダイマー化合物を用い、該ケテンダイマー化合物と澱粉等の紙表面加工剤を併用して新聞用紙の製造に適用することにより、前記目的が達成されることを見出した。本発明はかかる新たな知見に基づき完成されたものである。

【０００８】すなわち、本発明は、ケテンダイマー化合物を有効成分としてなる新聞用紙用表面サイズ剤、ならびに、紙表面加工剤および前記表面サイズ剤を含有してなる塗工液を、新聞原紙に塗工することを特徴とする新聞用紙の製造方法に関する。

【０００９】本発明では、新聞用紙の表面サイズ剤としてケテンダイマー化合物を用いる。かかるケテンダイマー化合物としては、一般式（１）：

【００１０】

【化１】



【００１１】（式中、R^1 およびR^2 は同一または相異なって炭素数８～３０の飽和または不飽和の炭化水素基を示す。）で表される脂肪族炭化水素置換ケテンダイマーがあげられる。このR^1 、R^2 の炭素数が８未満の場合には疎水性が不十分であり、サイズ効果が不満足となる。また、炭素数が３０を越える場合にはサイズ効果が更に向上するわけでなく、むしろこのようなケテンダイマー化合物の入手は困難である。

【００１２】前記ケテンダイマー化合物の具体例としては、例えばR^1 、R^2 がオクチル基、デシル基、ドデシル基、テトラデシル基、ヘキサデシル基、オクタデシル基、エイコシル基、ドコシル基またはテトラコシル基などの飽和アルキルケテンダイマー化合物；ヤシ油、パーム油、オリーブ油、落花生油、菜種油、牛脂油、ラードなどの天然油脂から調製されたケテンダイマー化合物；オレイン酸、リノール酸、リノレン酸、エレオステアリン酸、アラキドン酸などから調製された不飽和アルキルケテンダイマー化合物などがあげられる。これらケテンダイマー化合物は１種を単独でまたは２種以上を併用できる。

【００１３】ケテンダイマー化合物は、通常、水性分散液として用いられる。ケテンダイマー化合物の水性分散化方法としては特に制限はされず、従来公知の各種方法

をそのまま採用し得る。例えば、高圧ホモジナイザーなどを使用する高圧乳化法、反転乳化法等があげられる。また乳化に際しては、必要に応じて、安定なエマルジョンを形成しうるアニオン性、カチオン性、両性またはノニオン性の各種公知の乳化剤や保護コロイドを使用することができる。アニオン性乳化剤としては、例えばアルキル硫酸ソーダ、アルキルベンゼンスルホン酸ソーダ、ポリオキシエチレンアルキルエーテル硫酸ソーダ、ポリオキシエチレンアルキルフェニルエーテル硫酸ソーダ、アルキルスルホン酸ソーダ、ポリオキシエチレンアルキルエーテルスルホコハク酸ソーダ、ポリオキシエチレンアルキルエーテルリン酸エステル等があげられる。カチオン性乳化剤としては、例えばラウリルトリメチルアンモニウムクロライド、ジヒドロキシエチルステアリルアミン等があげられる。両性乳化剤としては、例えばラウリルアミノプロピオン酸ソーダ、ステアリルジメチルベタイン、ラウリルジヒドロキシエチルベタイン等があげられる。またノニオン性乳化剤としては、例えばポリエチレングリコール、ポリオキシエチレンアルキルエーテル、ポリオキシエチレンアルキルフェニルエーテル等およびこれらの末端水酸基のアセチル化物等があげられる。また保護コロイドとしては、ポリビニルアルコール、酸化澱粉などのノニオン性保護コロイド、ナフタレンスルホン酸ソーダホルムアルデヒド縮合物、リグニンスルホン酸ソーダホルムアルデヒド縮合物などのアニオン性保護コロイド、カチオン澱粉、ポリエチレンイミン－エピクロルヒドリン縮合物などのカチオン性保護コロイドおよびアニオン性、カチオン性、両性のポリマータイプの高分子保護コロイドがあげられる。これらはいずれも１種を単独でまたは２種以上を組み合わせて使用することができる。

【００１４】該乳化剤及び保護コロイドの使用量は、得られるエマルジョンの分散安定性を考慮して決定されるが、通常はケテンダイマー化合物に対して０．１～５０重量%、好ましくは１～３０重量%である。乳化剤及び保護コロイドの使用量が０．１%未満の場合には、得られるエマルジョンの安定性が不良であったり、粘度が高くなることがある。また、乳化剤及び保護コロイドの使用量が５０重量%を越える場合は、得られる表面サイズ剤のサイズ効果が低下し好ましくない。

【００１５】紙表面加工剤としては、通常の紙表面加工に使用されている各種公知のものがあげられる。たとえば、酸化澱粉、ジアルデヒド澱粉、りん酸澱粉、カチオン化澱粉などの澱粉類、完全ケン化ポリビニルアルコール、部分ケン化ポリビニルアルコール等のポリビニルアルコール類、カルボキシメチルセルロース類、アニオン性ポリアクリルアミド、カチオン性ポリアクリルアミド、両性ポリアクリルアミド等のポリアクリルアミド類等の各種の天然又は合成高分子物質があげられ、これらの１種を単独でまたは２種以上を組み合わせて使用できる。これらの紙表面加工剤は、表面強度の向上、紙粉防止、印刷適性の改善を目的として塗工されている。

【００１６】前記表面サイズ剤と紙表面加工剤の使用量は、所望するサイズ性により異なるが、表面サイズ剤が紙表面加工剤に対して、固形分換算で通常０．１～５０重量%、好ましくは０．５～３０重量%である。０．１重量%未満では十分なサイズ効果がなく、また５０重量%を越えて使用した場合は塗工液中の紙表面加工剤の量が相対的に低下し、所望する紙表面の強度を得るには塗工液の紙への塗工量を増加する必要が生じコストの上昇を招くため好ましくない。

【００１７】紙表面加工剤と表面サイズ剤を、新聞原紙に塗布する方法は特に制限はされないが、通常は、紙表面加工剤の水溶液を紙表面に塗布する際に、該水溶液中に表面サイズ剤を混合添加し、該混合液を新聞原紙に塗布する方法を採用することができる。また、前記表面加工剤の水溶液を前記方法により新聞原紙に予め表面加工した後、改めて表面サイズ剤を塗布する方法等を採用してもよい。

【００１８】また、紙表面加工剤と前記表面サイズ剤を含有してなる塗工液、または紙表面加工剤もしくは前記表面サイズ剤を含有してなる塗工液の塗布はゲートロールコーターを用いる。ゲートロールコーターは、塗工液を高速、高濃度で塗工でき、紙層表面への歩留まりが高く、乾燥熱量が少なくてすみ、異種類の表面加工剤を用いて両面同時塗工が可能なこと、平滑性、白色度、光沢、インキ受理性等の印刷適性の改善ができること、更には高濃度塗工が可能なため紙層中への水分移動が少なく塗工中の紙切れ、シワの発生が少ないこと等の利点があり新聞用紙の製造に適する。

【００１９】紙表面加工剤と前記表面サイズ剤を含有してなる塗工液、または紙表面加工剤もしくは前記表面サイズ剤を含有してなる塗工液を、新聞原紙表面に塗工する際の濃度および粘度は特に制限はされないが、いずれの塗工液も、通常はそれぞれ不揮発分０．５～２０重量%程度、好ましくは１～１５重量%、粘度１０００ｃｐｓ程度（２５℃）以下、好ましくは２００ｃｐｓ（２５℃）以下とされる。また、塗工液の塗布量は、新聞原紙に塗布された紙表面加工剤と前記表面サイズ剤の固形分付着量の合計量が、通常０．００５～５．０ｇ／m^2 程度、好ましくは０．０１～２．０ｇ／m^2 の範囲となるよう調節するのがよい。

【００２０】

【発明の効果】本発明の表面サイズ剤によれば、高濃度、高速塗工が可能なゲートロールコーターを用いて新聞用紙を製造することが可能になり、操業性を低下させず、また新聞用紙の品質を悪化させることなく新聞用紙に所望のサイズ性を付与することができる。

【００２１】

【実施例】以下、実施例を挙げて本発明を更に具体的に

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説明するが、本発明はこれらの実施例に限定されるものではない。なお、各例中の%は重量%を表す。

【００２２】実施例1

冷却管、撹拌機のついたフラスコに酸化澱粉（王子コーンスターチ（株）製、王子エースA）及び水を仕込み、撹拌、加熱し１０%濃度の酸化澱粉水溶液を得た。また、硬化牛脂油から製造されたケテンダイマー化合物１８部、１０%濃度のカチオン化澱粉（窒素含有率０．５%以上）水溶液２０部および脱イオン水６２部を仕込みホモミキサーで予備分散させた後、同温度にて３００ｋｇ／ｃｍ²の条件下にホモジナイザーに２回通して分散させ、直に冷却し２０%濃度の水性分散液を得た。次いで、前記１０%濃度の酸化澱粉水溶液５０部に、水４９．５部および前記２０%濃度のケテンダイマー化合物の水性分散液０．５部を混合し塗工液を調製した。該塗工液を、ゲートロールコーターにて新聞原紙（坪量４３ｇ／ｍ²）に塗工し、回転ドライヤーを用いて１００℃で1分間乾燥させて新聞用紙を得た。なお、塗工量は表1に示す。

【００２３】実施例2

実施例1において、硬化牛脂油から製造されたケテンダイマー化合物の代わりにステアリン酸から製造されたケテンダイマー化合物を使用した他は、実施例1と同様にして１５%濃度のケテンダイマー化合物の水性分散液を得た。次いで、実施例1で得た１０%濃度の酸化澱粉水溶液５０部、水４９．３部および前記１５%濃度のケテンダイマー化合物の水性分散液０．７部を混合し塗工液を調製した。また、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００２４】実施例3

実施例1において、硬化牛脂油から製造されたケテンダイマー化合物の代わりにベヘニン酸から製造されたケテンダイマー化合物を使用した他は、実施例1と同様にして２０%濃度のケテンダイマー化合物の水性分散液を得た。次いで、実施例1で得た１０%濃度の酸化澱粉水溶液５０部、水４９．５部および前記２０%濃度のケテンダイマー化合物の水性分散液０．５部を混合し塗工液を調製した。また、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００２５】実施例4

冷却管、撹拌機のついたフラスコにポリビニルアルコール（（株）クラレ製、ＰＶＡ１１７）および水を仕込み、撹拌、加熱し１０%濃度のポリビニルアルコール水溶液を得た。このポリビニルアルコール水溶液５０部に、水４９．５部および実施例1で得た２０%濃度のケテンダイマー化合物の水性分散液０．５部を混合し塗工液を調製した。また、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００２６】実施例5

２０%濃度のアニオン性ポリアクリルアミド（荒川化学

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工業（株）製、ポリマセット３０５）２５部に、水７４．５部および実施例3で得た２０%濃度のケテンダイマー化合物の水性分散液０．５部を混合し塗工液を調製した。また、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００２７】比較例1

１０%濃度の酸化澱粉水溶液を濃度５%に希釈して塗工液として使用した他は、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００２８】比較例2

１０%濃度のポリビニルアルコール（（株）クラレ製、ＰＶＡ１１７）水溶液を濃度５%に希釈し塗工液として使用した他は、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００２９】比較例3

２０%濃度のアニオン性ポリアクリルアミド（荒川化学工業（株）製、ポリマセット３０５）水溶液を濃度５%に希釈し塗工液として使用した他は、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００３０】比較例4

１０%濃度の酸化澱粉水溶液５０部、水４９．６部および２５%濃度のスチレン／マレイン酸共重合体アンモニウム塩（スチレン／マレイン酸＝５０／５０（モル%），粘度２５００ｃｐｓ（２５℃），ｐＨ９．５）水溶液０．４部を混合して塗工液として使用した他は、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００３１】比較例5

１０%濃度のポリビニルアルコール（（株）クラレ製、ＰＶＡ１１７）水溶液５０部、水４９．６部および２５%濃度のスチレン／アクリル共重合体ソーダ塩（スチレン／メタクリル酸ブチル／メタクリル酸＝４０／２０／４０（モル%），粘度８００ｃｐｓ（２５℃），ｐＨ１０．０）水溶液０．４部を混合して塗工液として使用した他は、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００３２】比較例6

２０%濃度のアニオン性ポリアクリルアミド（荒川化学工業（株）製、ポリマセット３０５）水溶液２５部、水７４．６部および２５%オレフィン／マレイン酸共重合体アンモニウム塩（１－オクテン／マレイン酸＝５０／５０（モル%），粘度１８００ｃｐｓ，ｐＨ９．２）水溶液０．４部を混合して塗工液として使用した他は、実施例1と同様にして新聞用紙を得た。なお、塗工量は表1に示す。

【００３３】（評価方法）実施例および比較例で得られた新聞用紙を恒温恒湿（２０℃、６５%Ｒ．Ｈ．）の環境下で1日調湿した後に、Ｊ．Ｔａｐｐｉ　Ｎｏ．３３（吸収性の紙の吸水速度試験）に準じ、1マイクロリットルの脱イオン水が吸収されるまでの時間を測定した。

結果を表1に示す。

*【表1】

【0034】

*

	塗工量 (g／m²)		吸水時間 (秒)
	吸液量	固形分	
実施例1	7．4	0．38	27．6
実施例2	7．3	0．37	29．6
実施例3	7．1	0．36	32．1
実施例4	8．9	0．45	24．3
実施例5	8．5	0．43	28．6
比較例1	7．5	0．38	3．2
比較例2	8．6	0．43	2．7
比較例3	8．9	0．45	3．3
比較例4	7．5	0．38	6．7
比較例5	8．4	0．43	5．4
比較例6	8．7	0．44	6．4

【0035】いずれの実施例も比較例にくらべ良好なサ※　※イズ効果を示すことがわかる。

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-119078

(43)Date of publication of application : 09.05.1995

(51)Int.Cl. D21H 19/10
D21H 17/05

(21)Application number : 05-196953

(22)Date of filing : 13.07.1993

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(72)Inventor : TORIGOE NORIAKI

(54) SURFACE SIZING AGENT FOR PAPER FOR NEWSPAPER AND PRODUCTION OF PAPER FOR NEWSPAPER

(57)Abstract:

PURPOSE: To enable production of newsprint paper by using a gate roll coater capable of coating at a high speed in high concentration and to supply a desired sizing agent to newsprint paper without reducing operation efficiency and deteriorating qualities of newsprint paper.

CONSTITUTION: A coating solution comprising a surface sizing agent containing a ketene dimer compound as an active ingredient and a paper surface processing agent is applied to base paper for newspaper by a gate roll coater to produce newsprint paper.

LEGAL STATUS

[Date of request for examination] 05.06.2000

[Date of sending the examiner's decision of rejection] 04.06.2002

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

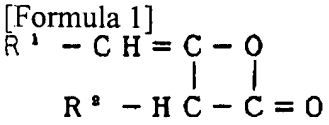
[Claim(s)]
[Claim 1] The surface sizing compound for newsprints which becomes considering a ketene dimer compound as an active principle.
[Claim 2] The manufacture approach of the newsprint characterized by carrying out coating of the coating liquid which comes to contain a paper surface treatment agent and a surface sizing compound according to claim 1 to newspaper stencil paper by the gate roll coater.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the manufacture approach of the surface sizing compound for newsprints, and a newsprint.
[0002]
[Description of the Prior Art] In recent years, the water resisting property to dampening water serves as demand quality important for a newsprint by the shift to offset printing of a newspaper printing method. However, when the approach learned as an approach of giving a water resisting property (size nature) to paper, for example, the approach of adding an internal sizing compound to a raw material pulp slurry at the time of paper making, and the approach of carrying out coating of the surface sizing compound to the paper after paper making are applied to manufacture of a newsprint, they have various problems.
[0003] That is, since the rosin emulsion sizing compound which is an internal sizing compound currently used widely by acid paper making by which a newsprint is generally milled is making water distribute with a surfactant mallein-izing or the fumaric-ized rosin which originally does not have water solubility, it essentially tends to foam and tends to cause the trouble by foaming by the Hakusui system in a high-speed paper machine like a newspaper paper machine. Moreover, since the grand pulp which a size effect cannot discover easily is used abundantly as a raw material, when a yield improver is used together with an internal sizing compound, a newsprint is incorporated to Kaminaka, and the pitch in a paper-making system etc. reduces the whiteness degree of a newsprint, and it also has the disadvantage of becoming the cause of quality aggravation.
[0004] Moreover, a newspaper paper machine is a high-speed paper machine, in order that the coating of the surface treatment agent of an on-machine may raise a slip of paper in the coater which carries out coating of low concentration coating liquid like size press, its coating liquid concentration is high and the gate roll coater by the coat formation imprint method in which high-speed coating is possible is common [coating]. It is found as a surface sizing compound. However, polymer sizing compounds, such as ******** styrene / maleic-acid copolymer, styrene / acrylic copolymer, and an olefin / maleic-acid copolymer Since it is designed so that it may combine with pulp fiber by desiccation and a size effect may be discovered after carrying out coating with low-concentration coating liquid like size press and permeating paper, Even if it applies to a gate roll coater, there is little osmosis in the paper of coating liquid, association of a polymer sizing compound and pulp fiber is inadequate, and the effectiveness is weak, even if a size effect is not discovered at all or it is discovered.
[0005] Thus, since sufficient size effect is not acquired even if it applies a well-known surface sizing compound to manufacture of a newsprint, the present condition is using the internal sizing compound in spite of an operable fall and aggravation of quality.
[0006]
[Problem(s) to be Solved by the Invention] This invention aims at offering the approach of manufacturing a newsprint using the surface sizing compound which can apply to manufacture of the newsprint which used the gate roll coater, and can give desired size nature to a newsprint, and this surface sizing compound.
[0007]
[Means for Solving the Problem] That the technical problem of said conventional technique should be solved, this invention person found out that said purpose was attained by using together paper surface treatment agents, such as this ketene dimer compound and starch, and applying to manufacture of a newsprint, using a ketene dimer compound as a surface sizing compound, as a result of repeating research wholeheartedly. This invention is completed based on the starting new knowledge.
[0008] That is, this invention relates to the manufacture approach of the newsprint characterized by carrying out coating of the coating liquid which comes to contain the surface sizing compound for newsprints which becomes considering a ketene dimer compound as an active principle, a paper surface treatment agent, and said surface sizing compound to

newspaper stencil paper.
[0009] In this invention, a ketene dimer compound is used as a surface sizing compound of a newsprint. As this ketene dimer compound, it is general formula (1): [0010].
[Formula 1]



[0011] (-- the inside of a formula, R1, and R2 are the same -- or it is different from each other and the hydrocarbon group of the saturation of carbon numbers 8-30 or partial saturation is shown.) -- the aliphatic hydrocarbon permutation ketene dimer expressed is raised. This R1 and R2 When a carbon number is less than eight, hydrophobicity is inadequate, and a size effect becomes dissatisfied. Moreover, when a carbon number exceeds 30, a size effect does not necessarily improve further, and acquisition of such [rather] a ketene dimer compound is difficult.
[0012] As an example of said ketene dimer compound For example, R1 and R2 An octyl radical, a decyl group, the dodecyl, a tetradecyl radical, Saturation alkyl ketene dimer compounds, such as a hexadecyl radical, an octadecyl radical, a ray KOSHIRU radical, a DOKOSHIRU radical, or a tetra-KOSHIRU radical; Palm oil, The ketene dimer compound prepared from natural oil fat, such as palm oil, olive oil, peanut oil, oleum rapae, a beef tallow oil, and lard; Oleic acid, The partial saturation alkyl ketene dimer compound prepared from linolic acid, the linolenic acid, the eleostearic acid, the arachidonic acid, etc. is raised. These ketene dimer compound is independent in one sort, or can use two or more sorts together.
[0013] A ketene dimer compound is usually used as aquosity dispersion liquid. As the water nature powder-ized approach of a ketene dimer compound, especially a limit is not carried out but can adopt various well-known approaches as they are conventionally. For example, the high-pressure emulsifying method, the reversal emulsifying method, etc. which use a high-pressure homogenizer etc. are raised. moreover, anionic [which can form a stable emulsion on the occasion of emulsification if needed], cationicity, both sexes, or nonionic various kinds -- a well-known emulsifier and protective colloid can be used. As an anionic emulsifier, alkyl-sulfuric-acid soda, alkylbenzene-sulfonic-acid soda, polyoxyethylene-alkyl-ether sodium sulfate, polyoxyethylene-alkyl-phenyl-ether sodium sulfate, alkyl sulfonic-acid soda, polyoxyethylene-alkyl-ether sulfo succinic-acid soda, polyoxyethylene-alkyl-ether phosphoric ester, etc. are raised, for example. As a cationic emulsifier, lauryl trimethylammonium chloride, dihydroxyethyl stearyl amine, etc. are raised, for example. As a both-sexes emulsifier, lauryl aminopropionic acid soda, a stearyl dimethyl betaine, a lauryl dihydroxyethyl betaine, etc. are raised, for example. Moreover, as a nonionic emulsifier, the acetylation object of these end hydroxyl groups, such as a polyethylene glycol, polyoxyethylene alkyl ether, and polyoxyethylene alkyl phenyl ether, etc. is raised, for example. Moreover, as protective colloid, the polymer type macromolecule protective colloid of cationic protective colloid, such as anionic protective colloid, such as nonionic protective colloid, such as polyvinyl alcohol and oxidization starch, a naphthalene sulfonic-acid soda formaldehyde condensate, and a ligninsulfonic acid soda formaldehyde condensate, cation starch, and a polyethyleneimine-epichlorohydrin condensate, and anionic, cationicity, and both sexes is raised. Each of these is independent or can use one sort combining two or more sorts.
[0014] Although the amount of this emulsifier and the protective colloid used is determined in consideration of the distributed stability of the emulsion obtained, it is usually 1 - 30 % of the weight preferably 0.1 to 50% of the weight to a ketene dimer compound. When the amount of an emulsifier and the protective colloid used is less than 0.1%, the stability of the emulsion obtained may be poor or viscosity may become high. Moreover, when the amount of an emulsifier and the protective colloid used exceeds 50 % of the weight, the size effect of the surface sizing compound obtained falls and is not desirable.
[0015] the various kinds currently used for the usual paper surface treatment as a paper surface treatment agent -- a well-known thing is raised. For example, various kinds of nature, such as polyacrylamides, such as polyvinyl alcohol, such as starch, such as oxidization starch, dialdehyde starch, phosphoric acid starch, and cation-ized starch, full saponification polyvinyl alcohol, and partial saponification polyvinyl alcohol, carboxymethyl celluloses, anionic polyacrylamide, cationic polyacrylamide, and both-sexes polyacrylamide, or the synthetic macromolecule matter is raised, it is independent or these one sort can be used combining two or more sorts. Coating of these paper surface treatment agents is carried out for the purpose of improvement in surface reinforcement, paper powder prevention, and an improvement of a printability.
[0016] Although the amount of said surface sizing compound and the paper surface treatment agent used changes with size nature for which it asks, a surface sizing compound is usually 0.5 - 30 % of the weight preferably 0.1 to 50% of the weight in solid content conversion to a paper surface treatment agent. It is not desirable in order for the amount of the paper surface treatment agent in coating liquid to increase the amount of coating to the paper of coating liquid to falling relatively and obtaining the reinforcement on the front face of paper for which it asks and to cause the rise of cost, when there is no size effect sufficient at less than 0.1 % of the weight and it is used exceeding 50 % of the weight.
[0017] Although especially a limit is not carried out, in case the approach of applying a paper surface treatment agent and

a surface sizing compound to newspaper stencil paper applies the water solution of a paper surface treatment agent to a paper front face, it can carry out mixed addition of the surface sizing compound into this water solution, and can usually adopt the approach of applying this mixed liquor to newspaper stencil paper. Moreover, after carrying out surface treatment of the water solution of said surface treatment agent to newspaper stencil paper beforehand by said approach, the approach of applying a surface sizing compound anew etc. may be adopted.

[0018] Moreover, spreading of the coating liquid which comes to contain the coating liquid which comes to contain a paper surface treatment agent and said surface sizing compound, a paper surface treatment agent, or said surface sizing compound uses a gate roll coater. A gate roll coater can carry out coating of the coating liquid in a high speed and high concentration, and the yield on the front face of paper is high, there are few desiccation heating values, it ends, and double-sided coincidence coating is possible using the surface treatment agent of different species, There are advantages, like that an improvement of printabilities, such as smooth nature, a whiteness degree, gloss, and ink acceptance nature, can be performed and since high concentration coating is still more possible, there is little moisture transfer to the inside of paper, and there are little the slip of paper in coating and generating of Siwa, and it is suitable for manufacture of a newsprint.

[0019] The coating liquid which comes to contain the coating liquid which comes to contain a paper surface treatment agent and said surface sizing compound, a paper surface treatment agent, or said surface sizing compound although especially a limit is not carried out for the concentration and viscosity at the time of carrying out coating to a newspaper stencil paper front face -- any coating liquid -- usually -- respectively -- about 0.5 - 20 % of the weight of nonvolatile matters -- being preferably taken below for 200cps (25 degrees C) hereafter the viscosity of about (25 degrees C) 1000cps one to 15% of the weight. moreover, the total quantity of the solid content coating weight of the paper surface treatment agent by which the coverage of coating liquid was applied to newspaper stencil paper, and said surface sizing compound -- usually -- 0.005 - 5.0 g/m2 extent -- desirable -- 0.01 - 2.0 g/m2 It is good to adjust so that it may become the range.

[0020]

[Effect of the Invention] According to the surface sizing compound of this invention, desired size nature can be given to a newsprint, without becoming possible to manufacture a newsprint using the gate roll coater in which high concentration and high-speed coating are possible, and not reducing operability, and worsening the quality of a newsprint.

[0021]

[Example] Although an example is given and this invention is explained still more concretely hereafter, this invention is not limited to these examples. In addition, % in each example expresses weight %.

[0022] Oxidization starch (the product made from Oji Corn starch, the Oji ace A) and water were taught and heated [agitated and] in the flask which example 1 cooling pipe and the agitator attached, and the oxidized starch water solution of concentration was obtained 10%. Moreover, after teaching the ketene dimer compound 18 section, the cation-ized starch (0.5% or more of nitrogen content) water solution 20 section of 10% concentration, and the deionized water 62 section which be manufactured from the hardening beef tallow oil and carrying out preliminary distribution by the homomixer, at this temperature, it let it pass twice, the homogenizer be distributed under the 300kg/cm2 condition, it cooled soon, and the aquosity dispersion liquid of concentration be obtained 20%. Subsequently, the water 49.5 section and said aquosity dispersion-liquid of ketene dimer compound of 20% concentration 0.5 section was mixed in the oxidized starch water-solution 50 section of concentration said 10%, and coating liquid was prepared. Coating of this coating liquid was carried out to newspaper stencil paper (basis-weight 43 g/m2) in the gate roll coater, it was dried for 1 minute at 100 degrees C using the rotation dryer, and the newsprint was obtained. In addition, the amount of coating is shown in Table 1.

[0023] In example 2 example 1, the ketene dimer compound manufactured from stearin acid instead of the ketene dimer compound manufactured from the hardening beef tallow oil was used, and also the aquosity dispersion liquid of the ketene dimer compound of concentration were obtained 15% like the example 1. Subsequently, the oxidized starch water-solution 50 section of 10% concentration obtained in the example 1, the water 49.3 section, and said aquosity dispersion-liquid of ketene dimer compound of 15% concentration 0.7 section was mixed, and coating liquid was prepared. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0024] In example 3 example 1, the ketene dimer compound manufactured from behenic acid instead of the ketene dimer compound manufactured from the hardening beef tallow oil was used, and also the aquosity dispersion liquid of the ketene dimer compound of concentration were obtained 20% like the example 1. Subsequently, the oxidized starch water-solution 50 section of 10% concentration obtained in the example 1, the water 49.5 section, and said aquosity dispersion-liquid of ketene dimer compound of 20% concentration 0.5 section was mixed, and coating liquid was prepared. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0025] Polyvinyl alcohol (Kuraray Make, PVA117) and water were taught and heated [agitated and] in the flask which example 4 cooling pipe and the agitator attached, and the polyvinyl alcohol water solution of concentration was obtained 10%. In this polyvinyl alcohol water-solution 50 section, the aquosity dispersion-liquid 0.5 section of the ketene dimer compound of concentration was mixed 20% obtained in the water 49.5 section and the example 1, and coating liquid was

prepared in it. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0026] In the anionic polyacrylamide (product [made from Arakawa Chemical industry], polymer set 305) 25 section of 520% concentration of examples, the aquosity dispersion-liquid 0.5 section of the ketene dimer compound of concentration was mixed 20% obtained in the water 74.5 section and the example 3, and coating liquid was prepared in it. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0027] Diluted the oxidized starch water solution of 110% concentration of examples of a comparison to 5% of concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0028] Diluted the polyvinyl alcohol (Kuraray Make, PVA117) water solution of 210% concentration of examples of a comparison to 5% of concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0029] Diluted the anionic polyacrylamide (product [made from Arakawa Chemical industry], polymer set 305) water solution of 320% concentration of examples of a comparison to 5% of concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0030] Mixed the oxidization starch water-solution 50 section of 410% concentration of examples of a comparison, the water 49.6 section, and the styrene / maleic-acid copolymer ammonium salt (styrene/maleic acid = 50/50 (mol %), viscosity [of 2500cps (25 degrees C)], pH9.5) water-solution 0.4 section of 25% concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0031] Mixed the polyvinyl alcohol (Kuraray Make, PVA117) water-solution 50 section of 510% concentration of examples of a comparison, the water 49.6 section, and the styrene / acrylic copolymer specific salt (styrene / methacrylic-acid butyl / methacrylic-acid =40/20/40 (mol %), viscosity [of 800cps (25 degrees C)], pH10.0) water-solution 0.4 section of 25% concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0032] Mixed the anionic polyacrylamide (product [made from Arakawa Chemical industry], polymer set 305) water-solution 25 section of 620% concentration of examples of a comparison, the water 74.6 section, and the 25% olefin / maleic-acid copolymer ammonium salt (1-octene / maleic acid = 50/50 (mol %), viscosity [of 1800cps], pH9.2) water-solution 0.4 section, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0033] (The evaluation approach) the newsprint obtained in the example and the example of a comparison -- constant temperature -- after carrying out gas conditioning under the environment of constant humidity (20 degrees C, 65%R.H.) for one day -- J.Tappi According to No.33 (water absorption speed test of the paper of absorptivity), time amount until the deionized water of one microliter is absorbed was measured. A result is shown in Table 1.

[0034]

[Table 1]

	塗工量 （g／m² ）		吸水時間 (秒)
	吸液量	固形分	
実施例1	7．4	0．38	27．6
実施例2	7．3	0．37	29．6
実施例3	7．1	0．36	32．1
実施例4	8．9	0．45	24．3
実施例5	8．5	0．43	28．6
比較例1	7．5	0．38	3．2
比較例2	8．6	0．43	2．7
比較例3	8．9	0．45	3．3
比較例4	7．5	0．38	6．7
比較例5	8．4	0．43	5．4
比較例6	8．7	0．44	6．4

[0035] Any example is known by that a good size effect is shown compared with the example of a comparison.

[Translation done.]

TECHNICAL FIELD

[Industrial Application] This invention relates to the manufacture approach of the surface sizing compound for newsprints, and a newsprint.

[Translation done.]

PRIOR ART

[Description of the Prior Art] In recent years, the water resisting property to dampening water serves as demand quality important for a newsprint by the shift to offset printing of a newspaper printing method. However, when the approach learned as an approach of giving a water resisting property (size nature) to paper, for example, the approach of adding an internal sizing compound to a raw material pulp slurry at the time of paper making, and the approach of carrying out coating of the surface sizing compound to the paper after paper making are applied to manufacture of a newsprint, they have various problems.

[0003] That is, since the rosin emulsion sizing compound which is an internal sizing compound currently used widely by acid paper making by which a newsprint is generally milled is making water distribute with a surfactant mallein-izing or the fumaric-ized rosin which originally does not have water solubility, it essentially tends to foam and tends to cause the trouble by foaming by the Hakusui system in a high-speed paper machine like a newspaper paper machine. Moreover, since the grand pulp which a size effect cannot discover easily is used abundantly as a raw material, when a yield improver is used together with an internal sizing compound, a newsprint is incorporated to Kaminaka, and the pitch in a paper-making system etc. reduces the whiteness degree of a newsprint, and it also has the disadvantage of becoming the cause of quality aggravation.

[0004] Moreover, a newspaper paper machine is a high-speed paper machine, in order that the coating of the surface treatment agent of an on-machine may raise a slip of paper in the coater which carries out coating of low concentration coating liquid like size press, its coating liquid concentration is high and the gate roll coater by the coat formation imprint method in which high-speed coating is possible is common [coating]. It is found as a surface sizing compound. However, polymer sizing compounds, such as ******** styrene / maleic-acid copolymer, styrene / acrylic copolymer, and an olefin / maleic-acid copolymer Since it is designed so that it may combine with pulp fiber by desiccation and a size effect may be discovered after carrying out coating with low-concentration coating liquid like size press and permeating paper, Even if it applies to a gate roll coater, there is little osmosis in the paper of coating liquid, association of a polymer sizing compound and pulp fiber is inadequate, and the effectiveness is weak, even if a size effect is not discovered at all or it is discovered.

[0005] Thus, since sufficient size effect is not acquired even if it applies a well-known surface sizing compound to manufacture of a newsprint, the present condition is using the internal sizing compound in spite of an operable fall and aggravation of quality.

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] According to the surface sizing compound of this invention, desired size nature can be given to a newsprint, without becoming possible to manufacture a newsprint using the gate roll coater in which high concentration and high-speed coating are possible, and not reducing operability, and worsening the quality of a newsprint.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention aims at offering the approach of manufacturing a newsprint using the surface sizing compound which can apply to manufacture of the newsprint which used the gate roll coater, and can give desired size nature to a newsprint, and this surface sizing compound.

[Translation done.]

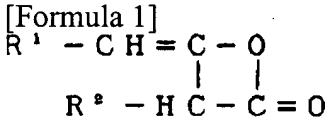
MEANS

[Means for Solving the Problem] That the technical problem of said conventional technique should be solved, this invention person found out that said purpose was attained by using together paper surface treatment agents, such as this ketene dimer compound and starch, and applying to manufacture of a newsprint, using a ketene dimer compound as a surface sizing compound, as a result of repeating research wholeheartedly. This invention is completed based on the starting new knowledge.

[0008] That is, this invention relates to the manufacture approach of the newsprint characterized by carrying out coating of the coating liquid which comes to contain the surface sizing compound for newsprints which becomes considering a ketene dimer compound as an active principle, a paper surface treatment agent, and said surface sizing compound to newspaper stencil paper.

[0009] In this invention, a ketene dimer compound is used as a surface sizing compound of a newsprint. As this ketene dimer compound, it is general formula (1): [0010].

[Formula 1]



[0011] (-- the inside of a formula, R1, and R2 are the same -- or it is different from each other and the hydrocarbon group of the saturation of carbon numbers 8-30 or partial saturation is shown.) -- the aliphatic hydrocarbon permutation ketene dimer expressed is raised. This R1 and R2 When a carbon number is less than eight, hydrophobicity is inadequate, and a size effect becomes dissatisfied. Moreover, when a carbon number exceeds 30, a size effect does not necessarily improve further, and acquisition of such [rather] a ketene dimer compound is difficult.

[0012] As an example of said ketene dimer compound For example, R1 and R2 An octyl radical, a decyl group, the dodecyl, a tetradecyl radical, Saturation alkyl ketene dimer compounds, such as a hexadecyl radical, an octadecyl radical, a ray KOSHIRU radical, a DOKOSHIRU radical, or a tetra-KOSHIRU radical; Palm oil, The ketene dimer compound prepared from natural oil fat, such as palm oil, olive oil, peanut oil, oleum rapae, a beef tallow oil, and lard; Oleic acid, The partial saturation alkyl ketene dimer compound prepared from linolic acid, the linolenic acid, the eleostearic acid, the arachidonic acid, etc. is raised. These ketene dimer compound is independent in one sort, or can use two or more sorts together.

[0013] A ketene dimer compound is usually used as aquosity dispersion liquid. As the water nature powder-ized approach of a ketene dimer compound, especially a limit is not carried out but can adopt various well-known approaches as they are conventionally. For example, the high-pressure emulsifying method, the reversal emulsifying method, etc. which use a high-pressure homogenizer etc. are raised. moreover, anionic [which can form a stable emulsion on the occasion of emulsification if needed], cationicity, both sexes, or nonionic various kinds -- a well-known emulsifier and protective colloid can be used. As an anionic emulsifier, alkyl-sulfuric-acid soda, alkylbenzene-sulfonic-acid soda, polyoxyethylene-alkyl-ether sodium sulfate, polyoxyethylene-alkyl-phenyl-ether sodium sulfate, alkyl sulfonic-acid soda, polyoxyethylene-alkyl-ether sulfo succinic-acid soda, polyoxyethylene-alkyl-ether phosphoric ester, etc. are raised, for example. As a cationic emulsifier, lauryl trimethylammonium chloride, dihydroxyethyl stearyl amine, etc. are raised, for example. As a both-sexes emulsifier, lauryl aminopropionic acid soda, a stearyl dimethyl betaine, a lauryl dihydroxyethyl betaine, etc. are raised, for example. Moreover, as a nonionic emulsifier, the acetylation object of these end hydroxyl groups, such as a polyethylene glycol, polyoxyethylene alkyl ether, and polyoxyethylene alkyl phenyl ether, etc. is raised, for example. Moreover, as protective colloid, the polymer type macromolecule protective colloid of cationic protective colloid, such as anionic protective colloid, such as nonionic protective colloid, such as polyvinyl alcohol and oxidization starch, a naphthalene sulfonic-acid soda formaldehyde condensate, and a ligninsulfonic acid soda formaldehyde condensate, cation starch, and a polyethyleneimine-epichlorohydrin condensate, and anionic, cationicity, and both sexes is raised. Each of these is independent or can use one sort combining two or more sorts.

[0014] Although the amount of this emulsifier and the protective colloid used is determined in consideration of the

distributed stability of the emulsion obtained, it is usually 1 - 30 % of the weight preferably 0.1 to 50% of the weight to a ketene dimer compound. When the amount of an emulsifier and the protective colloid used is less than 0.1%, the stability of the emulsion obtained may be poor or viscosity may become high. Moreover, when the amount of an emulsifier and the protective colloid used exceeds 50 % of the weight, the size effect of the surface sizing compound obtained falls and is not desirable.

[0015] the various kinds currently used for the usual paper surface treatment as a paper surface treatment agent -- a well-known thing is raised. For example, various kinds of nature, such as polyacrylamides, such as polyvinyl alcohol, such as starch, such as oxidization starch, dialdehyde starch, phosphoric acid starch, and cation-ized starch, full saponification polyvinyl alcohol, and partial saponification polyvinyl alcohol, carboxymethyl celluloses, anionic polyacrylamide, cationic polyacrylamide, and both-sexes polyacrylamide, or the synthetic macromolecule matter is raised, it is independent or these one sort can be used combining two or more sorts. Coating of these paper surface treatment agents is carried out for the purpose of improvement in surface reinforcement, paper powder prevention, and an improvement of a printability.

[0016] Although the amount of said surface sizing compound and the paper surface treatment agent used changes with size nature for which it asks, a surface sizing compound is usually 0.5 - 30 % of the weight preferably 0.1 to 50% of the weight in solid content conversion to a paper surface treatment agent. It is not desirable in order for the amount of the paper surface treatment agent in coating liquid to increase the amount of coating to the paper of coating liquid to falling relatively and obtaining the reinforcement on the front face of paper for which it asks and to cause the rise of cost, when there is no size effect sufficient at less than 0.1 % of the weight and it is used exceeding 50 % of the weight.

[0017] Although especially a limit is not carried out, in case the approach of applying a paper surface treatment agent and a surface sizing compound to newspaper stencil paper applies the water solution of a paper surface treatment agent to a paper front face, it can carry out mixed addition of the surface sizing compound into this water solution, and can usually adopt the approach of applying this mixed liquor to newspaper stencil paper. Moreover, after carrying out surface treatment of the water solution of said surface treatment agent to newspaper stencil paper beforehand by said approach, the approach of applying a surface sizing compound anew etc. may be adopted.

[0018] Moreover, spreading of the coating liquid which comes to contain the coating liquid which comes to contain a paper surface treatment agent and said surface sizing compound, a paper surface treatment agent, or said surface sizing compound uses a gate roll coater. A gate roll coater can carry out coating of the coating liquid in a high speed and high concentration, and the yield on the front face of paper is high, there are few desiccation heating values, it ends, and double-sided coincidence coating is possible using the surface treatment agent of different species, There are advantages, like that an improvement of printabilities, such as smooth nature, a whiteness degree, gloss, and ink acceptance nature, can be performed and since high concentration coating is still more possible, there is little moisture transfer to the inside of paper, and there are little the slip of paper in coating and generating of Siwa, and it is suitable for manufacture of a newsprint.

[0019] The coating liquid which comes to contain the coating liquid which comes to contain a paper surface treatment agent and said surface sizing compound, a paper surface treatment agent, or said surface sizing compound although especially a limit is not carried out for the concentration and viscosity at the time of carrying out coating to a newspaper stencil paper front face -- any coating liquid -- usually -- respectively -- about 0.5 - 20 % of the weight of nonvolatile matters -- being preferably taken below for 200cps (25 degrees C) hereafter the viscosity of about (25 degrees C) 1000cps one to 15% of the weight. moreover, the total quantity of the solid content coating weight of the paper surface treatment agent by which the coverage of coating liquid was applied to newspaper stencil paper, and said surface sizing compound -- usually -- 0.005 - 5.0 g/m2 extent -- desirable -- 0.01 - 2.0 g/m2 It is good to adjust so that it may become the range.

[Translation done.]

EXAMPLE

[Example] Although an example is given and this invention is explained still more concretely hereafter, this invention is not limited to these examples. In addition, % in each example expresses weight %.

[0022] Oxidization starch (the product made from Oji Corn starch, the Oji ace A) and water were taught and heated [agitated and] in the flask which example 1 cooling pipe and the agitator attached, and the oxidized starch water solution of concentration was obtained 10%. Moreover, after teaching the ketene dimer compound 18 section, the cation-ized starch (0.5% or more of nitrogen content) water solution 20 section of 10% concentration, and the deionized water 62 section which be manufactured from the hardening beef tallow oil and carrying out preliminary distribution by the homomixer, at this temperature, it let it pass twice, the homogenizer be distributed under the 300kg/cm2 condition, it cooled soon, and the aquosity dispersion liquid of concentration be obtained 20%. Subsequently, the water 49.5 section and said aquosity dispersion-liquid of ketene dimer compound of 20% concentration 0.5 section was mixed in the oxidized starch water-solution 50 section of concentration said 10%, and coating liquid was prepared. Coating of this coating liquid was carried out to newspaper stencil paper (basis-weight 43 g/m2) in the gate roll coater, it was dried for 1 minute at 100 degrees C using the rotation dryer, and the newsprint was obtained. In addition, the amount of coating is shown in Table 1.

[0023] In example 2 example 1, the ketene dimer compound manufactured from stearin acid instead of the ketene dimer compound manufactured from the hardening beef tallow oil was used, and also the aquosity dispersion liquid of the ketene dimer compound of concentration were obtained 15% like the example 1. Subsequently, the oxidized starch water-solution 50 section of 10% concentration obtained in the example 1, the water 49.3 section, and said aquosity dispersion-liquid of ketene dimer compound of 15% concentration 0.7 section was mixed, and coating liquid was prepared. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0024] In example 3 example 1, the ketene dimer compound manufactured from behenic acid instead of the ketene dimer compound manufactured from the hardening beef tallow oil was used, and also the aquosity dispersion liquid of the ketene dimer compound of concentration were obtained 20% like the example 1. Subsequently, the oxidized starch water-solution 50 section of 10% concentration obtained in the example 1, the water 49.5 section, and said aquosity dispersion-liquid of ketene dimer compound of 20% concentration 0.5 section was mixed, and coating liquid was prepared. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0025] Polyvinyl alcohol (Kuraray Make, PVA117) and water were taught and heated [agitated and] in the flask which example 4 cooling pipe and the agitator attached, and the polyvinyl alcohol water solution of concentration was obtained 10%. In this polyvinyl alcohol water-solution 50 section, the aquosity dispersion-liquid 0.5 section of the ketene dimer compound of concentration was mixed 20% obtained in the water 49.5 section and the example 1, and coating liquid was prepared in it. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0026] In the anionic polyacrylamide (product [made from Arakawa Chemical industry], polymer set 305) 25 section of 520% concentration of examples, the aquosity dispersion-liquid 0.5 section of the ketene dimer compound of concentration was mixed 20% obtained in the water 74.5 section and the example 3, and coating liquid was prepared in it. Moreover, the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0027] Diluted the oxidized starch water solution of 110% concentration of examples of a comparison to 5% of concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0028] Diluted the polyvinyl alcohol (Kuraray Make, PVA117) water solution of 210% concentration of examples of a comparison to 5% of concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0029] Diluted the anionic polyacrylamide (product [made from Arakawa Chemical industry], polymer set 305) water solution of 320% concentration of examples of a comparison to 5% of concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0030] Mixed the oxidization starch water-solution 50 section of 410% concentration of examples of a comparison, the water 49.6 section, and the styrene / maleic-acid copolymer ammonium salt (styrene/maleic acid = 50/50 (mol %), viscosity [of 2500cps (25 degrees C)], pH9.5) water-solution 0.4 section of 25% concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0031] Mixed the polyvinyl alcohol (Kuraray Make, PVA117) water-solution 50 section of 510% concentration of examples of a comparison, the water 49.6 section, and the styrene / acrylic copolymer specific salt (styrene / methacrylic-acid butyl / methacrylic-acid =40/20/40 (mol %), viscosity [of 800cps (25 degrees C)], pH10.0) water-solution 0.4 section of 25% concentration, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0032] Mixed the anionic polyacrylamide (product [made from Arakawa Chemical industry], polymer set 305) water-solution 25 section of 620% concentration of examples of a comparison, the water 74.6 section, and the 25% olefin / maleic-acid copolymer ammonium salt (1-octene / maleic acid = 50/50 (mol %), viscosity [of 1800cps], pH9.2) water-solution 0.4 section, and it was used as coating liquid, and also the newsprint was obtained like the example 1. In addition, the amount of coating is shown in Table 1.

[0033] (The evaluation approach) the newsprint obtained in the example and the example of a comparison -- constant temperature -- after carrying out gas conditioning under the environment of constant humidity (20 degrees C, 65%R.H.) for one day -- J.Tappi According to No.33 (water absorption speed test of the paper of absorptivity), time amount until the deionized water of one microliter is absorbed was measured. A result is shown in Table 1.

[0034]

[Table 1]

	塗工量 （g／m² ）		吸水時間 (秒)
	吸液量	固形分	
実施例1	7．4	0．38	27．6
実施例2	7．3	0．37	29．6
実施例3	7．1	0．36	32．1
実施例4	8．9	0．45	24．3
実施例5	8．5	0．43	28．6
比較例1	7．5	0．38	3．2
比較例2	8．6	0．43	2．7
比較例3	8．9	0．45	3．3
比較例4	7．5	0．38	6．7
比較例5	8．4	0．43	5．4
比較例6	8．7	0．44	6．4

[0035] Any example is known by that a good size effect is shown compared with the example of a comparison.

[Translation done.]